Operating Instructions

(Turbomatic 28 - 55 kW)

(Turbomatic 70 - 100 kW)

Turbomatic TMC 28-100

(with Lambdatronic H 3200)

Be sure to read and comply with the operating instructions and safety information

Subject to technical change.

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Dear customer,

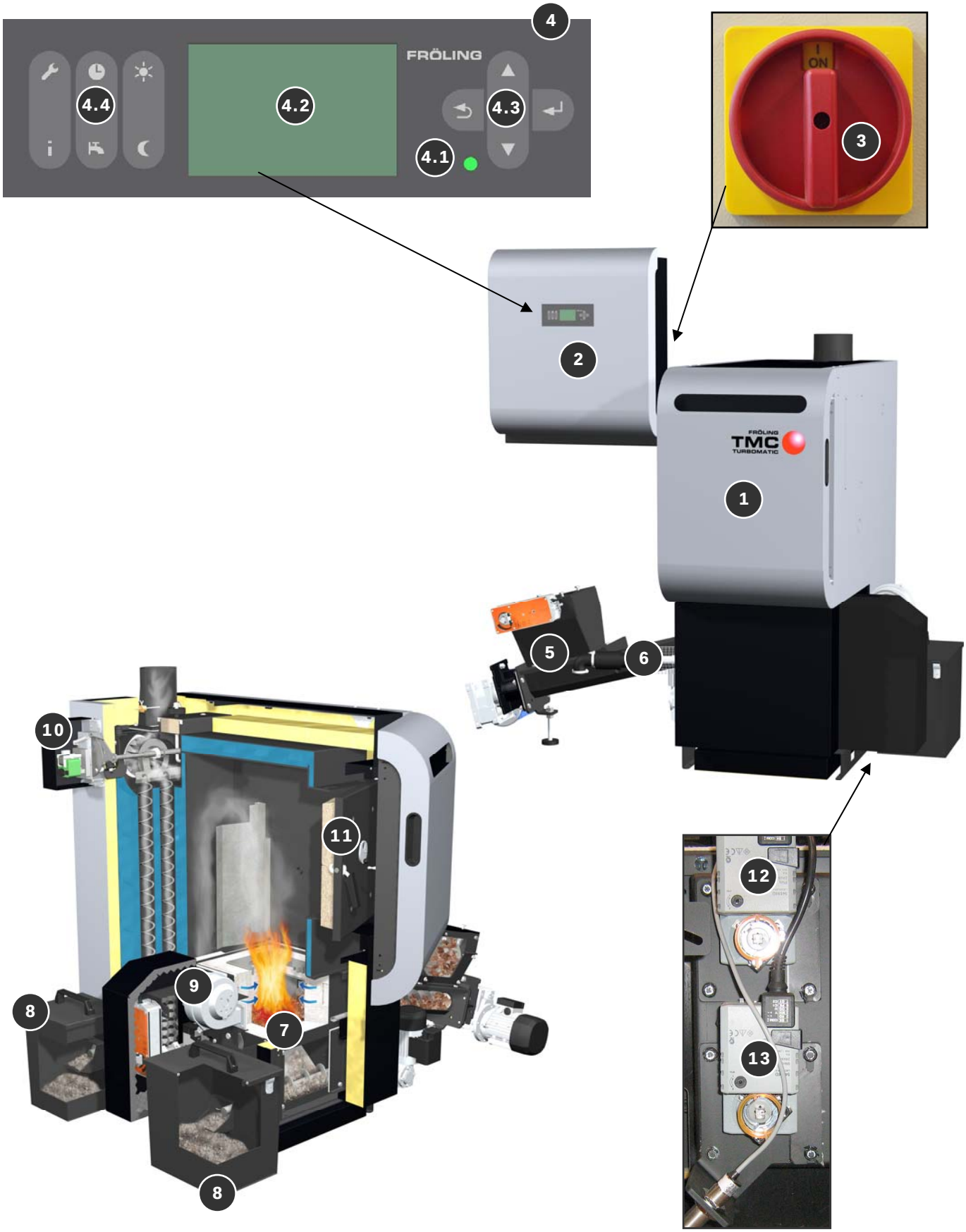
Congratulations on choosing a quality product from FRÖLING.

The FRÖLING Turbomatic waste wood boiler features a state-of-the-art design that conforms to all currently applicable standards and testing guidelines.

Please read and observe the operating instructions and always keep them close to the boiler for reference. They contain safety information and all the operation and maintenance specifications needed to operate the boiler safely, properly and economically.

The constant further development of our products means that there may be minor differences from the pictures and content. If you discover any errors, please let us know.
Subject to technical change.

1 Product overview



Pos.	Description	Symb.
1	Wood chip boiler - Fröling Turbomatic	
2	Switch cabinet with integrated Lambdatronic H 3200 controller	
3	Main switch: switch the power supply on and off for the entire system	
4	Control panel of the Lambdatronic H 3200 controller	
4.1	Status LED (operating status): - slow green flashing light: boiler activated - fast green flashing light: boiler deactivated - red flashing light: Fault	
4.2	Large graphical display to show operating statuses and parameters	
4.3	Navigation keys to move around in the menus and to change the parameter values	
4.4	Function keys for calling up individual boiler functions or modes directly	
5	Fuel transport unit with top gravity shaft, burn back flap or rotary valve as a burn back protection system and stoker screw for fuel transport	
6	Automatic ignition	
7	Automatic tipping grate with shaker	
8	Ash box of automatic ash removal unit or second ash box for automatic heat exchanger ash removal unit (optional for TMC 28-55, standard part of delivery for TMC 70-100)	
9	Combustion air blower fan: pressure-side fan for supplying primary and secondary air	
10	WOS system with turbulators and automatic drive for heat exchanger cleaning	
11	Combustion chamber door with inspection glass	
12	Secondary air control with actuator drive	
13	Primary air control with actuator drive	

2 Safety

2.1 Safety information

DANGER

Non-permitted use!

Incorrect use of the boiler can cause severe injuries and damage!

The instructions and information provided in the instructions should be observed!

Details on procedure for operation, maintenance and cleaning, as well as troubleshooting for the boiler are included in the individual instructions. Any further work should be carried out by authorised heating engineers or by Fröling customer services.

WARNING

External influences!

Negative external influences, such as insufficient combustion air or non-permitted fuel can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases or flash fires) which can in turn cause serious accidents!

Instructions and information for versions and minimum values, as well as norms and guidelines for heating components in the instructions must be observed!

WARNING

Severe injuries and damage can be caused by an inadequate flue gas system!

Problems with the flue system, such as poor cleaning of the flue pipe or insufficient chimney draught can cause serious faults in combustion (such as spontaneous combustion of carbonisation gases or flash fires)!

You can only be guaranteed of optimum performance from the boiler if the flue gas system is running smoothly!

2.2 Permitted uses

The boiler should only be operated when it is in full working order. It should be operated in accordance with the instructions, observing safety precautions, and you should ensure you are aware of the potential hazards.
Ensure that any faults, which might impair safety, are rectified immediately.

The Turbomatic series wood chip boiler is intended exclusively for heating central heating water. Use only the fuels specified under 2.2.1.

The manufacturer or supplier is not liable for any damages resulting from non-permitted uses.

2.2.1 Permitted fuels

Wood chips

	Designation as per		Description as per ÖNORM M 7133
	ÖNORM M 7133	ÖNORM / DIN CEN / TS 14961	
Water content	**W20**	**M20**	Air dried
	W30	**M30**	Suitable for storage
Size	**G30**	**P16**	Fine wood chips
	G50	**P45**	Medium wood chips (only for TMC 70 - 100)

Applicable Standards:

§

Austria: ÖNORM M 7133 or ÖNORM CEN/TS 14961

Germany: Wood chips in accordance with §3 (1) point 4 of the 1st BImSchV i.d.g.F.

Specifications as per DIN CEN/TS 14961 and/or ÖNORM M 7133

Pellets

Wood pellets made from natural wood with a diameter of 6 - 10 mm

Exception:
When using a pellet suction system the maximum diameter is of the wood pellets is limited to 6 mm.

Applicable Standards:

§

Austria:	ÖNORM M 7135 - HP 1 and/or DINplus certification program
Germany:	DIN 51731 - HP 5, DINplus certification program and/or ÖNORM M 7135 - HP 1

Generally applicable:

Before refilling the store, check for pellet dust and clean if necessary.

Shavings

As shavings generally cause problems with combustion, it is only permitted to use them after authorisation from Fröling. The following additional points also apply:

- ☞ Sawdust and carpentry waste should only be used with systems with a rotary valve.
- ☞ The store should be fitted with a pressure release device in accordance with regional regulations.
- ☞ The same limits apply for the permitted water content of sawdust as for wood chips.

Miscanthus

Switchgrass or elephant grass (Latin name: *Miscanthus*) is a C4 plant.

Standards and regulations for burning these plants have not been standardised, so the following applies:

- ☞ **The regional regulations for burning *Miscanthus* should be observed. Operation may only be possible with individual authorisation**

Changing the fuel

⚠ CAUTION

Incorrectly set fuel parameters:

Incorrect parameter settings have a significant effect on the functioning of the boiler, and as a result this will void the guarantee.

If the fuel is changed (e.g. from wood chips to pellets), the system must be reset by Fröling customer services.

2.2.2 Non-permitted fuels

⚠ CAUTION

Use of non-permitted fuels:

Burning non-permitted fuels leads to a build-up of aggressive sedimentation and condensation, which can lead to damage to the boiler and also voids the warranty!

All fuels not defined under 2.1.1 are considered non-permitted. Due to various air-quality protection regulations, non-permitted fuels include:

- Chipboard waste, treated wood-wastes, pure grinding dust,
- Refuse, large quantities of paper, cardboard packaging, ...
- Coal (brown coal, anthracite coal, briquettes...)

2.2.3 Who may operate the boiler?

Only trained operators are permitted to operate the boiler.

⚠ CAUTION

If unauthorised persons enter the boiler room:

Risk of injury and damage to equipment!

It is the responsibility of the operator to ensure that unauthorised persons, especially children, are kept away from the boiler.

2.3 Design information

It is forbidden to carry out modifications to the boiler or to change or deactivate safety equipment.

Always comply with all fire, building, and electrical regulations when installing or operating the boiler system, in addition to following the operating instructions and mandatory regulations that apply in the country in which the boiler is operated.

2.3.1 Approval and obligation to report

NOTICE

Each heating system must be officially authorised.

The appropriate supervisory authority (inspection agency) must always be informed when installing or modifying a heating system, and authorisation obtained from the building authorities.

Austria:	Inform the civic/municipal building authorities.
Germany:	Register with an approved chimney sweep/the building authorities.
Other countries:	Observe local regulations for authorisation

2.3.2 Requirements for central heating water

The requirements for heating water are based on the following standards:

Applicable standards:

§

Austria:	ÖNORM H 5195-1
Germany:	VDI 2035
Switzerland:	SWKI 97-1

If the system is topped up or refilled:

Prepare (soften) the water to prevent boiler scaling.

2.3.3 Ventilation of boiler room

The openings for the supply air and the exhaust air should be arranged as close to opposite each other as possible to achieve a good thermal draught effect.

☞ The supply air must be drawn in directly from outside. Exhaust air must be discharged directly outside.

Provided they are not contradicted by the relevant building regulations room where the boiler is to be installed, the following standards apply:

Applicable Standards:

§

- TRVB H 118
- ÖNORM H 5170

Provide a supply air cross-section of 2 cm^2 per kW of boiler rated output, as per ÖNORM H 5170, but a total cross-section of at least 200 cm^2

2.3.4 Installing the heating system / Standards

The following standards govern the installation of heating systems:

Applicable standards:

§

ÖNORM / DIN EN 12828 Heating Systems in Buildings

Storage tank

NOTICE

A storage tank with the proper dimensions will guarantee the best boiler operating values during the entire heating period.

Please contact your installer or Fröling directly for the right measurements for the storage tank.

Return feed lift

If the hot water return feed is below the minimum return feed temperature, some of the hot water outfeed will be mixed in.

⚠ CAUTION

Risk of dropping below dew point / condensation formation if operated without return feed lift.

Condensation water forms an aggressive condensate when combined with combustion residue, leading to damage to the boiler.

Regulations stipulate the use of a return feed lift.

2.3.5 Chimney connection / chimney system

EN 303-5 specifies that the entire flue gas system must be designed to prevent, wherever possible, damage caused by seepage, insufficient feed pressure and condensation.

It should be noted here that flue gas temperatures of less than 160 K above room temperature can occur within the permitted operating range of the boiler.

The flue gas temperatures (for clean systems) and additional flue gas values can be found in the technical specification sheets.

➥ Page 15, Boiler data for constructing the flue gas system:

The connection between the boiler and the chimney system should be as short as possible. The incline of the connection should not exceed 30 - 45°. Insulate the connection.

The entire flue gas system (chimney and connection) must be calculated as per ÖNORM /DIN EN 13384-1 or prior standards
ÖNORM M 7515/DIN 4705-1.

Local regulations and other statutory regulations also apply.

☞ The chimney must be authorised by a smoke trap sweeper or chimney sweep.

☞ As per TRVB H 118 (only in Austria) an explosion flap must be installed in the flue pipe or in the chimney. (installing an explosion flap is recommended, except in Austria)

Draught limiter

☞ We recommend that a draught limiter is fitted (A)

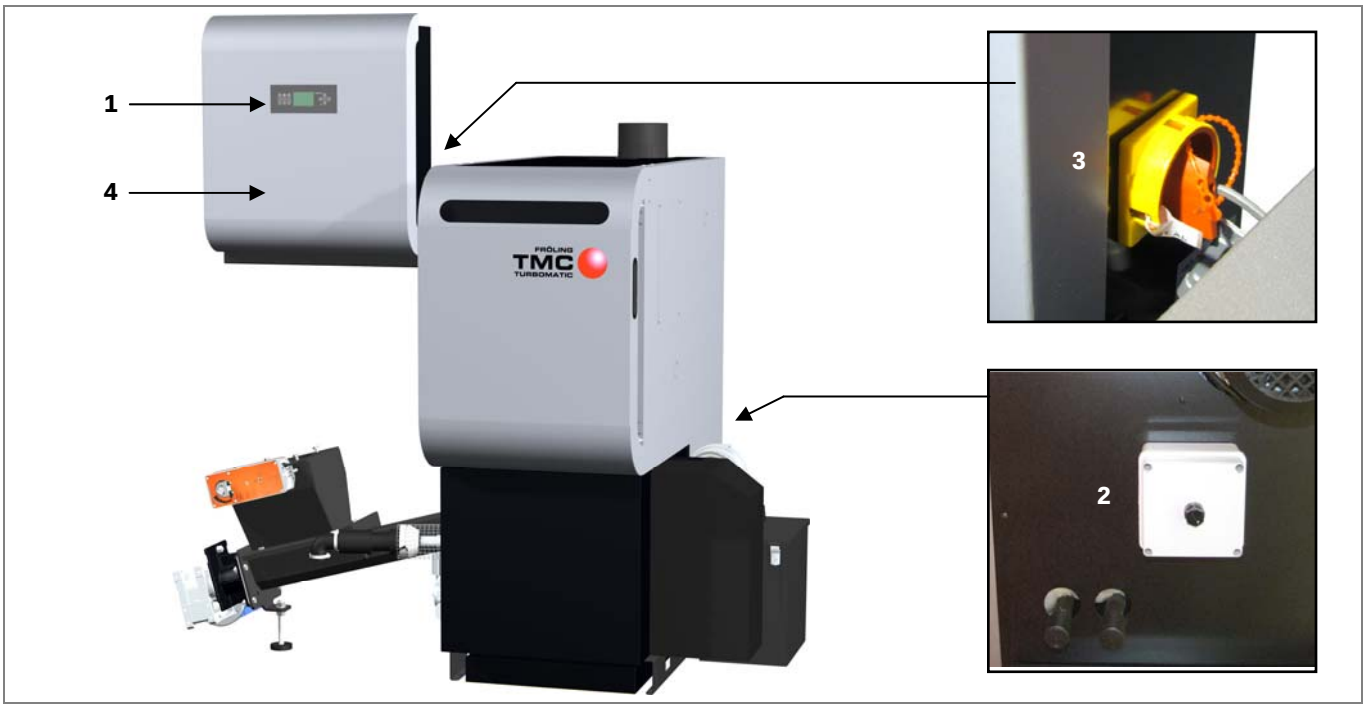
☞ Install the draught limiter directly under the mouth of the flue line, as there is always low pressure there.

Boiler data for constructing the flue gas system:

Description		Units	28	35	48	55	70	85	100
Flue gas temperature	RL	°C	165	180	170	185	170	170	180
Flue gas mass flow	RL	kg/h	87	111	150	175	220	265	315
Flue gas mass flow	RL	kg/s	0.024	0.031	0.042	0.049	0.061	0.074	0.088
Feed pressure required	RL	Pa	10	10	10	10	10	10	10
	PL		5	5	5	5	5	5	5
Feed pressure required	RL	mbar	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	PL		0.05	0.05	0.05	0.05	0.05	0.05	0.05
Flue pipe diameter		mm	150	150	150	150	200	200	200

RL = Rated load, PL = Partial load;

2.4 Safety devices



1	Automatic operation button 	If the boiler overheats: ❒ Press and hold the  button for 5 seconds ↪ Automatic operation is switched off and the controller follows the boiler shutdown procedure ☞ **The pumps continue to run!** ☞ **Never use the main switch.**
2	Safety temperature limiter (back of boiler)	➲ Page 17, ➲ Devices for preventing the boiler from overheating
3	Main switch 	For shutting down the entire system ❒ The power to all components is switched off. ☞ Only switch off the main switch when the boiler has cooled down and the controller is switched off (“Boiler off” status).
4	Fuses (in switch cabinet)	They fuse the controller and electrical components When changing the fuses, note the following: ☞ Only have the fuses changed by an electrician, and the power supply should be switched off. ☞ Observe the rated current on the fuses.
Not shown	Water sprinkler system 	In case of burn back, the valve of the water sprinkler system opens and water goes into the gravity shaft as well as the duct of the feed screw. ☞ This need only be connected when specified by the authorities.

2.4.1 Devices for preventing the boiler from overheating

Thermal discharge safety device

At around 100 °C a valve opens and sends cold water to the safety heat-exchanger to decrease the temperature.

Safety Temperature Limiter STL

Stops combustion at a max. boiler temperature of 105 °C. The pumps continue to run.

☞ Once the temperature has fallen to under approx. 95 °C, the safety temperature limiter (1) can be unlocked mechanically.

Safety valve

Protection against over-heating/ excessive pressure:

When the boiler pressure reaches a maximum of 3 bar, the safety valve opens and the heating water is released in the form of steam.

2.5 Safety instructions for the installation room

- Danger of fire due to flammable materials.
  No flammable materials should be stored near the boiler.
- Damage due to impurities in combustion air.
  Do not use any solvents or cleaning agents containing chlorine in the room where the boiler is installed.
- Keep the air suction opening of the boiler free of dust.
- The room where the boiler is installed must be frost-proof.

2.6 Residual risks

WARNING

Touching hot surfaces!

Hot parts and the flue pipe can cause serious burns!

- ❒ It should be standard practice to wear protective gloves when working on the boiler.
- ❒ Only operate the boiler using the handles provided for this purpose.
- ❒ Insulate the flue pipes or simply avoid touching them during operation.

Before carrying out maintenance work on/in the boiler:

- ❒ Press and hold the button for 5 seconds
  - ➥ The controller follows the shutdown procedure and starts with the cleaning cycle.
  - ➥ After the cleaning cycle the boiler goes to the operating status, “Cleaning possible”

WARNING

Opening the combustion chamber door during operation!

This may cause injury, damage and smoke!

It is forbidden to open the doors behind the insulating door during operation!

WARNING

Use of non-permitted fuel!

Non-standard fuels can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases / flash fires) which can lead to serious accidents!

Only use fuels specified in the chapter on “Permitted Uses” in these operating instructions.

2.7 Emergency procedure

2.7.1 Overheating of the system

If the system overheats in spite of the safety devices, proceed as follows:

- ❒ Keep all the doors on the boiler closed.
- ❒ Turn off the boiler by pressing the button for 5 seconds
  - ☞ Under no circumstances use the main switch!
- ❒ Open all mixer taps, switch on all pumps.
  - ☞ Fröling heating circuit control takes over this function in automatic operation.
  - ☞ When using a third party controller, carry out the relevant measures to activate the mixer and pumps manually.
  - ❒ Leave the boiler room and close the door.
  - ❒ Open any available radiator thermostat valves

If the temperature does not drop, inform the installer or Fröling customer services:

➲ Page 41, 6.2 Address of manufacturer

2.7.2 Smell of flue gas

⚠ DANGER

Smell of flue gas!

Flue gases can cause fatal poisoning!

- ❒ Keep all the doors on the boiler closed.
- ❒ Turn off the boiler by pressing the button for 5 seconds
  - ☞ **Under no circumstances use the main switch!**
- ❒ Air the room where the boiler is installed
- ❒ Close the door of the installation or boiler room and doors to living areas.

3 Operating the system

3.1 Initial start-up

NOTICE

☞ **Optimum efficiency and efficient, low-emission operation can only be guaranteed if the system is set up by trained professionals and observing the standard factory settings.**

Take the following precautions:

❒ Initial start-up should be carried out with an authorised installer or with Fröling customer services.

The individual steps for initial start-up are explained in the operating instructions for the controller.

➲ See the operating instructions for the Lambdatronic H 3200

NOTICE

If condensation escapes during the initial heat-up phase, this does not indicate a fault.

☞ If this occurs, clean up using a cleaning rag.

3.2 Filling / refilling the store with fuel

When you fill the store you should always ensure that you are using the right fuel:

➲ Page 9, 2.2.1 Permitted fuels

The following also applies when loading fuel:

Pellets are delivered by tanker and blown into the store. The boiler must be “OFF” when filling the store. The under-pressure from the blowing could bring smoke back into the store.

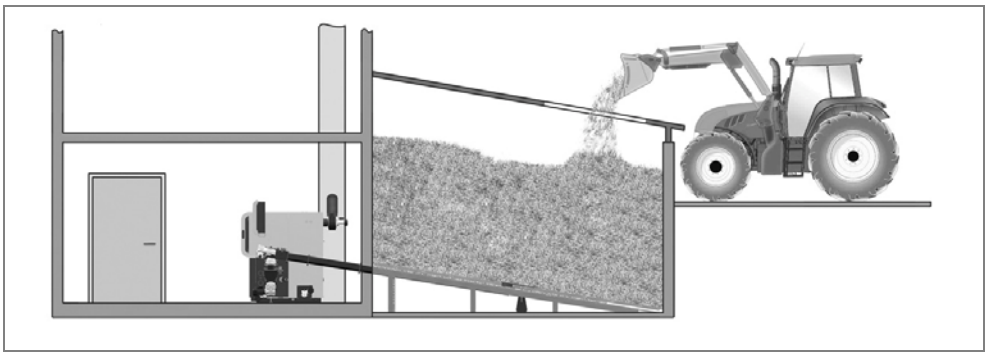
⚠ CAUTION

Injuries and damage to property from blowing pellets into the store when the boiler is switched on!

❒ Turn off the boiler by pressing the button for 5 seconds

❒ Let the boiler cool down in “Boiler Off” status for **at least an hour**

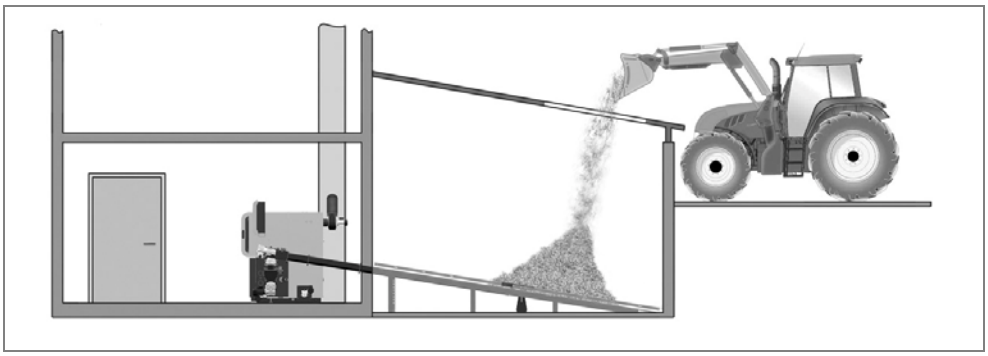
3.2.1 Loading wood chips in a partially emptied store



If there is still sufficient fuel in the store (the head of the stirrer is completely covered with fuel), the store can be filled:

❒ Load the fuel at the filling opening

3.2.2 Loading wood chips in an empty store

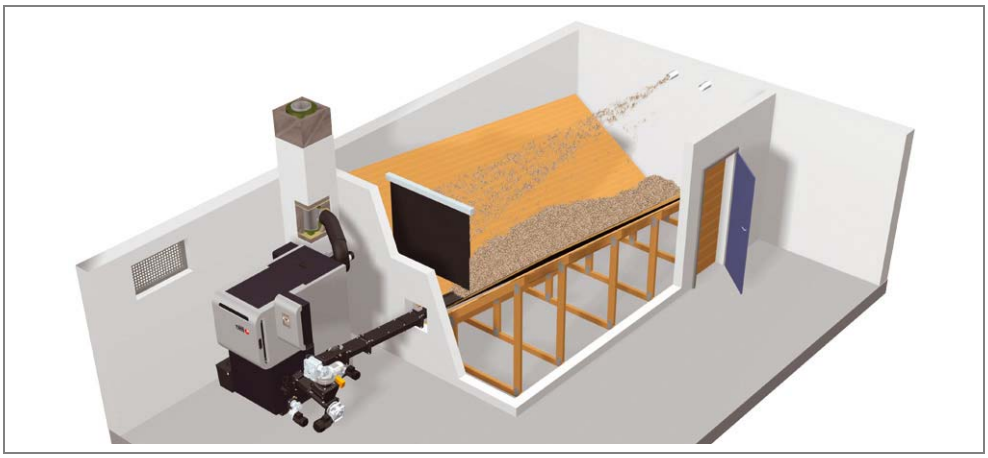


☞ **CAUTION! If the head of the stirrer is already free of material and the arms / spring blades are extended, then the feeder unit must be active during the filling process.**

❒ Press and hold the ☀ button for 5 seconds
↪ “Extra heating” mode is activated

❒ Load a small quantity of wood chips and wait until the arms / spring blades are touching the head of the stirrer (approx. 2 revolutions)
❒ Only then should you load the remaining material

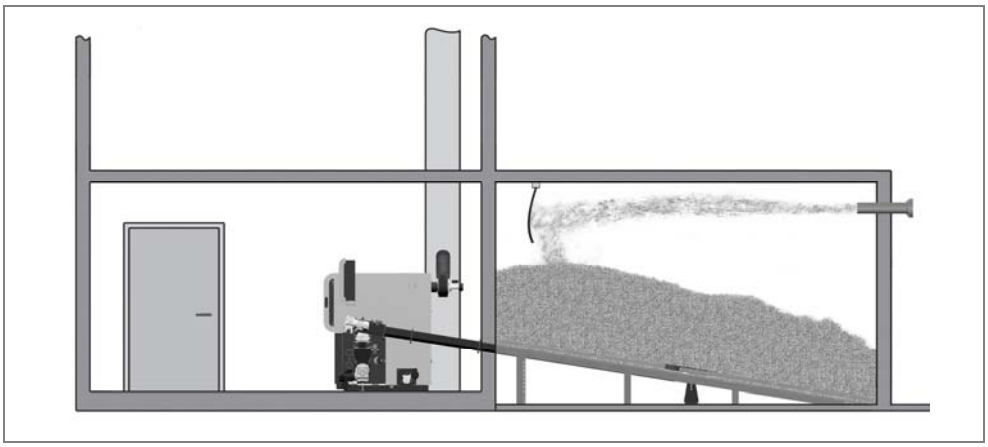
3.2.3 Blowing in pellets for a store with pellet screw



For systems with a pellet screw, the boiler must be in “OFF” status when the store is filled. The under-pressure from the blowing could bring smoke back into the store.

- ❒ Switch off the boiler by pressing the button for 5 seconds and allow it to cool down for at least two hours.
- ❒ Close all openings to the store to seal out dust
- ❒ Blow the fuel into the store

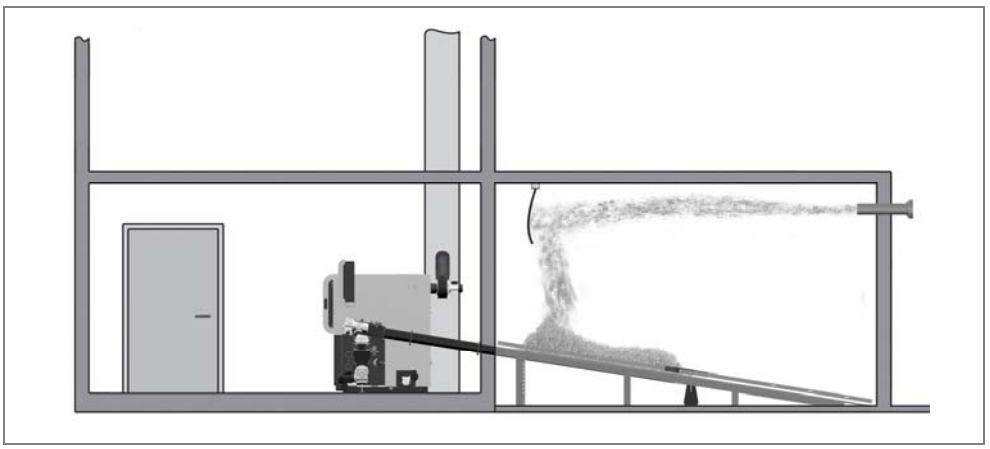
3.2.4 Blowing in pellets for a partially emptied store with stirrer



If there is still sufficient fuel in the store (the head of the stirrer is completely covered with fuel), the store can be filled:

- ❒ Switch off the boiler by pressing the button for 5 seconds and allow it to cool down for at least two hours.
- ❒ Close all openings to the store to seal out dust
- ❒ Blow the fuel into the store

3.2.5 Blowing in pellets for an empty store with stirrer

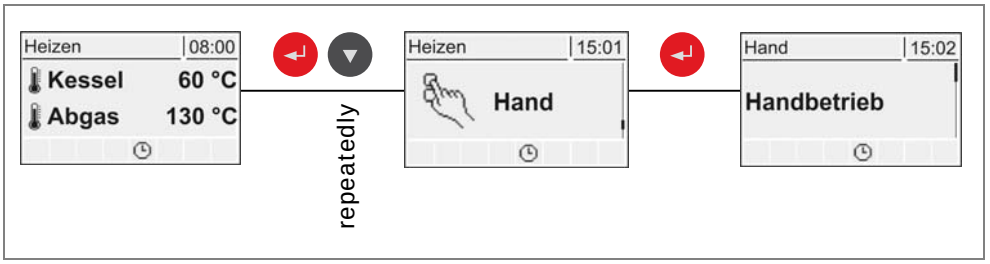


☞ **CAUTION! If the head of the stirrer is already free of material and the arms / spring blades are extended, then the feeder unit must be active during the filling process, however the boiler must be in "OFF" status.**

❒ Turn off the boiler by pressing the button for 5 seconds and allow it to cool down for at least two hours

❒ Close all openings to the store to seal out dust

❒ Call up the "Manual operation" menu



❒ Activate the following units in the order shown:

- Ash screw	ON
- Tilt motor	ON
- Stoker	FORWARD
- Burn back flap drive	ON (or rotary valve ON)
- Pellet feeder system from bunker	FORWARD

❒ Blow the fuel into the store

❒ After approx. 5 min deactivate the feed screw and burn back flap

❒ Wait until the stoker is completely emptied, and only then deactivate the stoker screw

☞ If there is a fuel residue in the stoke, there is a danger of a flash fire the next time the boiler is started, due to a large feed quantity.

❒ Wait until all the pellets in the chamber have been transported to the ash bucket, and only then deactivate the ash screw.

☞ If there is fuel residue in the boiler, the chamber can be damaged the next time the boiler is started.

❒ Empty the ash bucket after the end of the procedure

☞ If there is fuel residue in the ash bucket, there is a danger of fire.

3.3 Heating up the boiler

3.3.1 Switching on the system

❒ Turn the main switch on the side of the switch cabinet to the “ON” position
  ↪ After the system check by the controller, the system is ready for operation
  ↪ “Boiler Off” is shown on the display

3.3.2 Switching on the boiler

❒ Press the button
  ↪ Automatic operation is activated
  ↪ The heating system is controlled via the controller according to the selected mode.

3.3.3 Controlling the boiler

➲ See the operating instructions for the Lambdatronic H 3200

3.3.4 Switching off the boiler

❒ Press and hold the button for 5 seconds
  ↪ The boiler follows the shutdown program and switches to “Boiler OFF” status.
  ↪ The combustion unit is switched off, the chamber delivery unit and the active hydraulic system are active

3.3.5 Switching off the system

☞ **CAUTION! Only when the boiler is cold, in “Boiler Off” status!**

❒ Switch off the main switch on the controller
  ↪ The controller is switched off
  ↪ The components powered via the switch cabinet are powered down
  ☞ The expansion switch cabinet, which has its own power supply, is still live!

3.4 Emergency firewood operation

⚠ CAUTION

Incorrect emergency firewood operation

Damage to the boiler is possible!

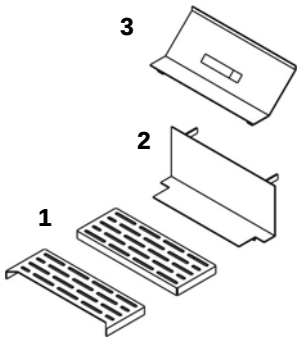
The following points must be observed for emergency firewood operation:

❒ Operate only in exceptional cases
  ↪ We accept no responsibility for damage caused by continuous emergency operation!
❒ Connect a thermal discharge safety device to the safety battery
❒ Feed based on output
❒ Use a storage tank of the right size

☞ Only convert to emergency operation and activate, or convert back to standard operation and activate, in “Boiler Off” operating status.

The Turbomatic TMC series boiler offers the option of manual emergency firewood operation. This requires the optional “expansion set for emergency firewood operation.” consisting of:

- 1 x grate insert set (1)
- 1 x combustion plate (2)
- 1 x cover plate (3)



3.4.1 Modifying the boiler for emergency firewood operation

⚠ WARNING

Do not carry out modifications when the boiler is hot!

Hot parts and the flue pipe can cause serious burns!

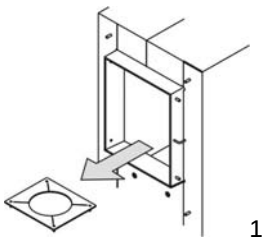
❒ It should be standard practice to wear protective gloves when working on the boiler.
❒ Only operate the boiler using the handles provided for this purpose.
❒ Insulate the flue pipes or simply avoid touching them during operation.

Before carrying out work in the boiler:

❒ Turn off the boiler by pressing the button for 5 seconds and let it cool off

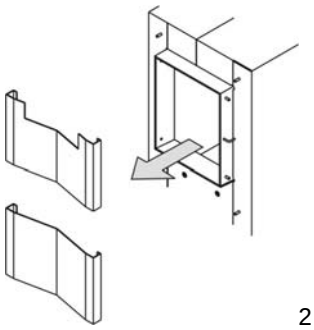
When the boiler has cooled off:

- ❒ Remove the burn-out opening from the combustion chamber



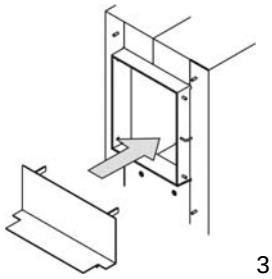
1.

- ❒ Push the guide plates in the U-profiles up and remove
- ❒ Check the guide plates for dirt. Clean where necessary.



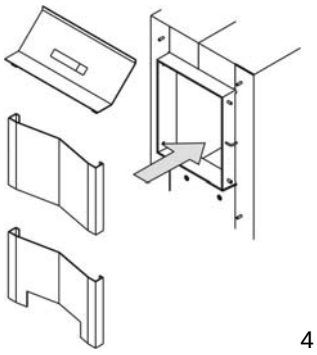
2.

- ❒ Insert the burn-out plate with the cutouts (1) behind the U-profiles



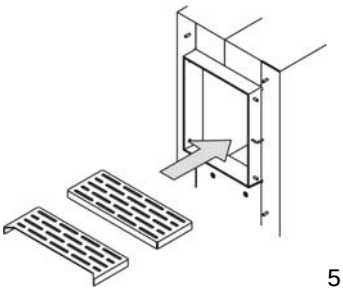
3.

- ❒ Insert the guide plates at the U-profiles in the combustion chamber and push downwards
- ❒ Ensure that the burn-out slit (2) is at the bottom!



4.

- ❒ Put the grate insert into the combustion chamber as shown

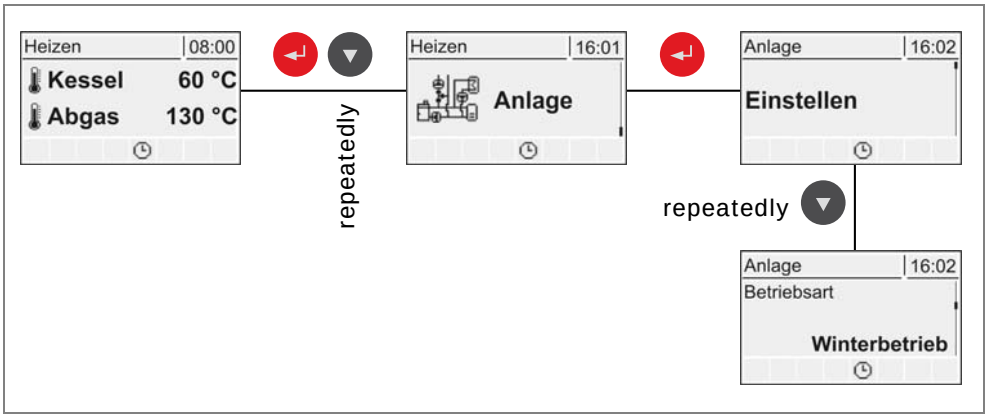


5.

3.4.2 Setting the controller for emergency firewood operation

For emergency firewood operation, the mode must be set to “Firewood operation” on the controller:

❒ Call up the “Mode” menu



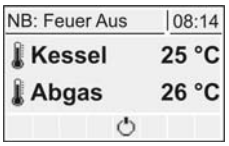
In the mode menu:

❒ Press the button
  ➥ A “?” is shown next to the mode
  ➥ Parameter is released for editing

❒ Press the button until “Firewood operation” appears in the display

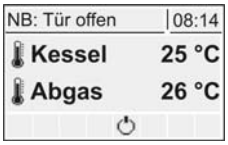
❒ Press the button
  ➥ Firewood operation is set

❒ Press the button 2x
  ➥ A starting screen with the operating status “Emerg. Oper.: Shutdown” is displayed
  ➥ Emergency firewood operation has not yet been started



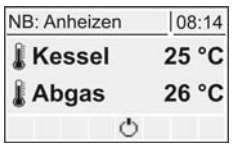
3.4.3 Filling the boiler with firewood

- ❒ Open the insulating door and combustion chamber door
  - ➥ Combustion air blower fan and induced draught fan switch on



- ❒ Put a layer of firewood onto the emergency grate
- ❒ Put crumpled paper and firewood on top of it
- ❒ Arrange the required quantity of firewood lengthwise
- ❒ Light the paper

- ❒ Press the button and close all the doors
  - ➥ Emergency firewood operation has started
  - ➥ Operating status “Emerg. Oper.: Heating up” is displayed



3.5 Modifying the boiler for normal operation

The procedure to modify the boiler for normal operation is, of course, carried out in the opposite order to the modifications for emergency operation

NOTICE

Before starting up the automatic burner, check and clean the boiler. The main points to check are the chamber, the induced draught fan and the heat exchanger equipment!

4 Boiler servicing

4.1 General information on servicing

DANGER

Working on electrical components

Risk of serious injuries from electric shocks

❒ Work on electrical components should only be carried out by authorised technicians

WARNING

Non-permitted cleaning and maintenance!

Incorrect or insufficient cleaning and maintenance of the boiler can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases / flash fires) and this can lead to serious accidents and damage!

Only clean the boiler when it is in “Boiler Off” operating status and in accordance with the instructions. Follow the boiler operating instructions.

WARNING

Carrying out maintenance when the boiler is hot!

Hot parts and the flue pipe can cause serious burns!

❒ It should be standard practice to wear protective gloves when working on the boiler.
❒ Only operate the boiler using the handles provided for this purpose.
❒ Insulate the flue pipes or simply avoid touching them during operation.

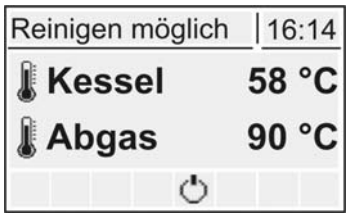
Before starting any maintenance work:

❒ Press and hold the  button for 5 seconds
  ↪ The controller follows the shutdown procedure and starts with the cleaning cycle.
  ↪ After the cleaning cycle the boiler goes to the operating status, “Cleaning possible”

❒ After maintenance has been carried out switch the boiler on in the desired mode.
  ☞ In service mode the boiler does not start automatically.

4.1.1 Service mode

Service mode should be activated for maintenance work on the boiler:

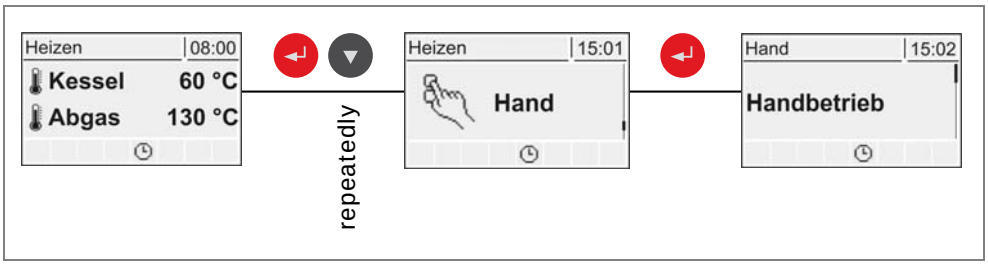


❒ Press and hold the button for 5 seconds

↪ The controller follows the shutdown procedure and starts with the cleaning cycle.

↪ After the cleaning cycle the boiler goes to the operating status, “Cleaning possible”

❒ Call up the “Manual operation” menu



The following manual operation functions are possible in service mode:

- Ash screw drive ON/OFF
- WOS drive ON/OFF
- Tilt motor ON/OFF
- Vibrator ON/OFF

❒ After maintenance has been carried out switch the boiler on in the desired mode.

☞ In service mode the boiler does not start automatically.

4.2 Inspection, cleaning and maintenance

☞ Regular cleaning of the boiler extends its life and is a basic requirement for smooth running based on output.
So clean the boiler regularly!

4.2.1 Inspection

Checking the ash level

The ash box must be emptied at the correct interval according to energy requirements and fuel quality.

❒ Open the insulating door and combustion chamber door
❒ Carry out a visual inspection of the combustion chamber for dirt

In the “Manual operation” menu:
- ❒ Switch on the ash screw
- ❒ Open the tipping grate

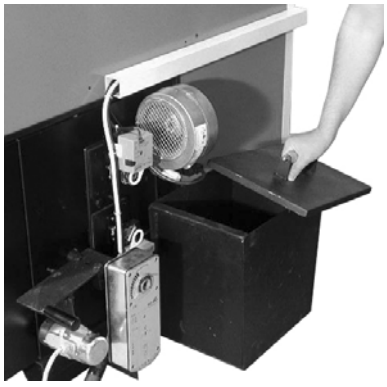
❒ Tip up the burn-out opening and move the ash in the combustion chamber downwards
  ↪ The ash screw brings the ash that falls into the ash box

❒ Clean the combustion chamber and chamber

In the “Manual operation” menu:
- ❒ Stop the ash screw
- ❒ Close the tipping grate

❒ Remove the cover of the ash box and check the ash level

❒ If necessary remove the ash box from the screw duct and empty



☞ **CAUTION: Always ensure that the ash boxes are pushed fully onto the screw duct and the covers are closed tightly.**

☞ **CAUTION: Never operate the boiler for a long period without ash boxes or with the covers open.**
This can damage the boiler and the chamber.

Checking the thermal discharge safety device

- ❒ Check the seal of the discharge valve
  - ↪ The discharge pipe must not drip
  - ☞ Exception: boiler temperature > 95 °C

If water is dripping from the discharge pipe:

- ❒ Clean the discharge safety device or have the installer replace it if necessary

Check the safety valve as per the manufacturer's specifications

Checking the system pressure

- ❒ Check the system pressure on the pressure gauge
  - ↪ The value must be 20% over the pre-stressed pressure of the expansion tank
  - ➲ Expansion tank operating instructions

If the system pressure decreases:

- ❒ Reload with water
  - ☞ If this occurs frequently, the seal of the heating system is faulty! Inform your installer!

In case of large pressure fluctuations:

- ❒ Have the expansion tank checked.

Checking the geared motors

- ❒ Carry out a visual inspection of the seal on the geared motors of the stoker screw and ash screw
  - ↪ There should not be a large quantity of lubricant coming out.

- ☞ If a few drops of lubricant are coming out, this can be normal. If a lot of lubricant is being lost, inform your installer or Fröling customer services.

4.2.2 Monthly cleaning

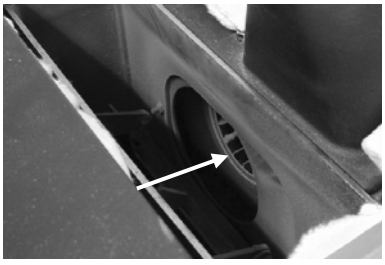
Cleaning the combustion chamber

- ❒ Open the insulating door and combustion chamber door
- ❒ Remove the burn-out opening
- ❒ Remove the dirt on the burn-out opening with a brush

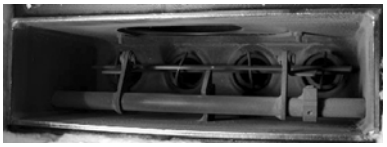
- ❒ Take out the ash baffle on the back of the combustion chamber and clean
- ❒ Remove soot that has built up on the side walls with the ash scraper
- ❒ Carry out a visual inspection of the firebrick for damage

Cleaning the heat-exchanger and flue gas collection chamber

- ❒ Loosen the screw on the upper cleaning cover
- ❒ Remove the cleaning cover



- ❒ Clean the flue gas collection chamber and the opening to the induced draught fan with a brush
- ❒ Remove any ash which has fallen down.

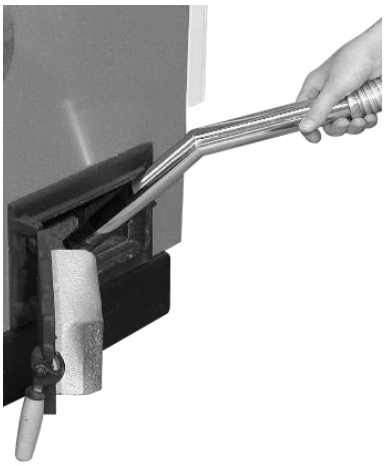


☞ We recommend that you use an ash vacuum.

Removing ash from the cleaning system

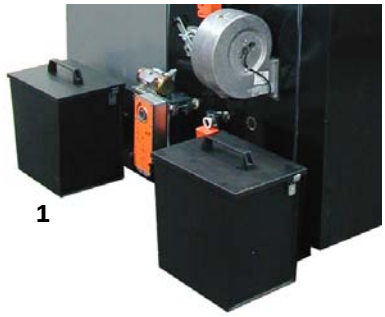
For Turbomatic 28-55

- ❒ Open the side cleaning door and remove the ash
- ☞ We recommend that you use an ash vacuum.



For optional automatic heat exchanger ash removal unit:

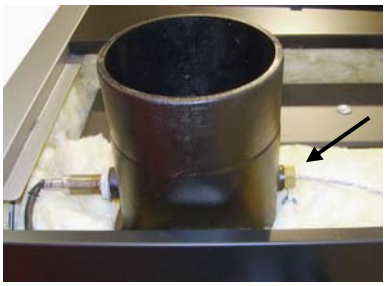
- ❒ Empty rear ash box (1)



Cleaning the flue gas sensors

On flue gas pipe:

- ❒ Loosen the threaded pin and remove the flue gas sensor



- ❒ Wipe off the flue gas sensor with a clean cloth
- ❒ Slide in the flue gas sensing element and secure it hand-tight using the threaded pin

4.2.3 Annual check

☞ Carry out annually, or at least after 1500 hours of operation!

The following applies for the annual check:

❒ Turn off the main switch on the switch cabinet when the boiler has cooled off

Cleaning the smoke flue pipe

❒ Clean the connecting pipe between the boiler and the chimney regularly with a chimney sweeping brush

❒ After cleaning, clean fallen ash from the induced draught unit housing, to prevent the fan from becoming blocked

☞ TIP: remove the flue gas sensors before cleaning to avoid damage

☞ Depending on the layout of the flue pipes and the chimney draught cleaning annually may not be enough!
The cleaning interval should be adjusted accordingly.

Checking the draught controller flap and explosion flap

❒ Check the draught controller flap and explosion flap for ease of movement

↪ If they cannot move smoothly, have them replaced immediately.

➲ Settings see page 15, Boiler data for constructing the flue gas system:

Cleaning the induced draught ventilator

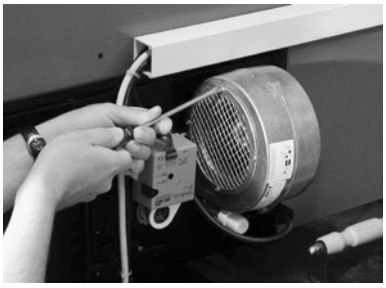
❒ Detach the induced draught ventilator on the back of the boiler

❒ Check for dirt and damage

❒ Clean the blower wheel with a soft brush or paint brush

☞ Do not move the balancing weights on the blower wheel!

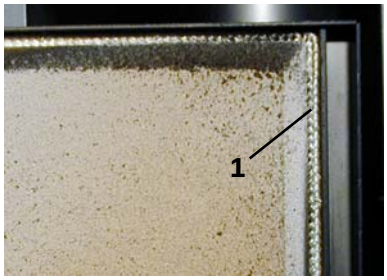
Cleaning the combustion air blower fan



- ❒ Unscrew 4 screws on the blower fan and take off the protective grating
- ❒ Clean the running wheel and protective grating (cloth, compressed air, ...)
- ❒ Put the protective grating back on and fix with screws

- ❒ Switch the main switch on the switch cabinet back on

Checking the combustion chamber door



- ❒ Close the combustion chamber door and check its seal
- ❒ Check glass fibre seal (1) for perfect alignment on the door frame
  - ➥ Imprint in the fibre-glass seal

If the seal is coloured black at several points or the imprint is interrupted:

- ➥ The seal is no longer efficient.
- ☞ Tighten the door latches or replace the glass fibre seal

Cleaning the combustion chamber door below the ash baffle

- ❒ Remove the front insulation of the chamber and take off the inspection cover (1)
- ❒ Remove the ash under the ash baffle
- ❒ Take off the ash baffle and clean
- ☞ The illustrations above show the place of installation for the stoker unit left. For the stoker unit right the ash baffle is behind the ash screw!

4.3 Instructions for measuring emissions

4.3.1 Measurement at rated load

❒ For the highest possible heat consumption:
- Ensure that heating pumps are switched on
- Open mixer valves and radiator valves
- Set the DHW tank loading time to the current time
- Set the boiler temperature setpoint to 85°C

☞ Chimney sweep mode takes over this function

Activating chimney-sweep mode

❒ Press the  button

↪ The chimney sweeper program for boiler measurement is started. The system is operated for 45 minutes at rated load. For this aim the maximum boiler temperature, the maximum heating circuit flow temperature and the DHW tank loading are released.

When is it possible to measure:
- Flue gas temperature at approx. 170°C
- O_2 content of the flue gas between 8 and 12% (corresponds to a CO_2 content between 13 and 19%)
- Boiler temperature above 65°C

4.3.2 Measurement at partial load (if necessary)

❒ For heat consumption ensure:
- Ensure that heating pumps are switched on
- Open mixer valves and radiator valves
- Set the DHW tank loading time to the current time

❒ Force partial load:
- After measuring at rated load, lower the boiler temperature setpoint by 5°C

When is it possible to measure:
- Flue gas temperature at approx. 140°C
- O_2 content of the flue gas between 10 and 14% (corresponds to a CO_2 content between 11 and 7%)
- Boiler temperature above 65°C

☞ After measurement all adjusted parameters (e.g. DHW tank loading times, ...) must be reset to their original value!

4.4 Maintenance agreement / Customer service

☞ Long service life with a service agreement!

Regular maintenance and servicing by a heating specialist will ensure a long, trouble-free service life for your heating system.
It will ensure that your system stays environmentally-friendly and operates efficiently and cost-effectively.

For this reason, FRÖLING offers a service agreement, which optimises operating safety. Please see the details in the accompanying guarantee certificate.

Your Fröling customer service office is also glad to advise you.

4.5 Replacement parts

With Fröling original replacement parts in your boiler, you are using parts, which match perfectly. As the parts fit together so well, installation times are shortened and lifespan is maintained.

NOTICE

Installing non-original parts voids the guarantee!

❒ Only replace components or parts with original replacement parts

5 Troubleshooting

5.1 General faults in the power supply

Error characteristics	Cause of error	Error correction
Nothing is shown on the display **No power to the controller**	• General power failure • FI circuit breaker or line protection is switched off • Main switch is turned off • Faulty fuse in the controller	❒ Switch on the FI circuit breaker or line protection ❒ Turn on the main switch ❒ Turn off the main switch ❒ Replace fuse – note current (e.g. 10A) ❒ Turn on the main switch

5.1.1 Behaviour of system after a power failure

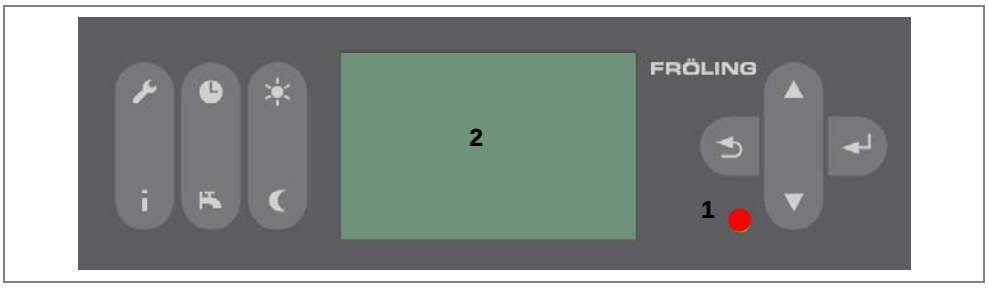
When the power supply has been restored the boiler returns to the previously specified mode and is controlled according to the specified program.

5.2 Excessive temperature

The safety temperature limiter (STL) shuts down the boiler when it reaches a temperature of approx. 100°C. After the boiler has cooled down, the safety temperature limiter must be manually unlocked:

❒ Unscrew the cap on the safety temperature limiter (1)
❒ Reset the safety temperature limiter by pressing with a screw-driver.
❒ Replace the cap

5.3 Faults with fault message



If a fault has occurred and has not yet been cleared:

- ↪ Status LED (1) flashes red
- ↪ A fault message is shown on the display (2)

An internal distinction is made between 2 types of message:

Warning	Boiler follows shutdown procedure
Error	Boiler shuts down immediately, heating circuit controller and pumps remain active

5.3.1 Procedure for fault messages

The procedure for a fault message as well as causes for faults and procedure for troubleshooting are described in the operating instructions for the boiler controller:

➥ See the operating instructions for the Lambdatronic H 3200

5.3.2 Acknowledging a fault message

Trace and remove the fault and then:

- ❒ Press the ↵ button
  - ↪ Status LED flashes green

6 Appendix

6.1 Guarantee Conditions

Our sale and delivery conditions generally apply. These conditions have been made available to customers, and customers have been made aware of them at the time of order completion.

You can also find the guarantee conditions on the enclosed guarantee certificate.

6.2 Address of manufacturer

FRÖLING
Heizkessel- und Behälterbau GesmbH

Industriestraße 12
A-4710 Grieskirchen
AUSTRIA

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FAX +43 (0)7248 606 600
E-MAIL info@froeling.com
WEBSITE www.froeling.com

6.3 Declaration of Conformity

fröling

EU DECLARATION OF CONFORMITY

Product: **Wood chip and pellet burner with automatic loading**

Types: **Turbomatic 28, Turbomatic 35, Turbomatic 48, Turbomatic 55, Turbomatic 70, Turbomatic 85, Turbomatic 100, Turbomatic 110**

with feeder systems
Bottom stirrer (BRK), spring blade stirrer (FBR), articulated arm delivery unit (GLA), pellet screw, pellets suction system

EC Directives:

98/37/EC	Machine directive
2006/95/EC	Low voltage directive
2004/108/EC	EMC directive

Applicable standards and guidelines:

EN 60335-1 A14	Household and similar electrical appliances - Safety
EN 61000-6-2	Electromagnetic compatibility – immunity to interference
EN 61000-6-3	Electromagnetic compatibility – interference emission
EN 303-05	Boilers for solid fuels up to 300 kW Requirements, testing and designation
TRVB H118	Technical directives on fire protection/prevention Automatic wood-burning systems

We hereby certify that the series-produced versions of the above products comply with the directives, guidelines and standards specified.

Grieskirchen, 17/10/2007

Quality assurance

Technical services

Fröling Heizkessel- und Behälterbau Ges.m.b.H, Industriestraße 12, A-4710 Grieskirchen
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